

REMARKS

This Response is submitted in reply to the Final Office Action dated January 27, 2010. In light of the following remarks, pending claims 1 and 3-28 should be allowed. Reconsideration and notice to that effect are respectfully requested.

Rejections under 35 U.S.C. §103

In the Office Action, claims 1, 3, 6-22, 24, 25 and 27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over McCormick et al. Claims 1, 3, 15, 20 and 25 recite a heat spreader construction or an integrated circuitry including a base portion formed from one of a list of materials and a frame portion formed from one of a list of materials, where the material forming the frame portion is different from the material forming the base portion. As stated in the specification, “Base portion 20 and frame portion 30 can be formed of the same material or can have differing compositions relative to one another.” (Page 2, para. 29 of the published application).

The Examiner concedes that McCormick et al. do not disclose, suggest or teach a base portion and a frame portion made of different materials. Specifically the “base portion” 112 and “frame portion” 110 identified by the Examiner are both formed from nickel plated copper. However, the Examiner asserts that because it was well known that copper has very good thermal conductivity and is widely used for thermally conducting/dissipating elements, it would have been obvious as the time of the invention for a person of ordinary skill in the art to use the same or different materials for the heat spreader and frame since such modification is not proven to be critical for the invention and choice of materials has been held to be within the general skill of a worker in the art. (Office Action dated 1/27/2010, Pages 2-3).

As an initial matter, it is unclear to Applicants how knowledge that copper has very good thermal conductivity and is widely used for thermally conducting/dissipating elements provides a basis for using two different materials. Rather, it simply establishes that copper is a suitable heat spreader material. Accordingly, this alone provides no basis for the obviousness rejection.

Furthermore, Applicants disagree that criticality of the two different materials is not disclosed in the application. Conventional heat spreaders have been fabricated from a single piece of material. (Page 2, para. 20 of the published application). Thus, formation of a heat

spreader having a cavity could be particularly time-consuming, difficult and expensive, especially when the material utilized is expensive. (Page 2, para. 23 of the published application). By contrast, “One aspect of the invention is to develop methodology and heat spreader configurations to allow cost effective manufacture of heat spreaders capable of maintaining the integrity and performance and microelectronic devices.” (Pages 1-2, para. 19 of the published application). This is accomplished by using “materials with high heat conductivity to be localized in appropriate heat-receiving/dissipating areas while replacing less critical regions of the spreader with less expensive or more easily fabricated materials.” (Page 2, para. 19 of the published application). Due in part to the two piece construction of the heat spreader of the present invention, different materials can be used for the base portion and the frame portion of the heat spreader. This is made possible because the base portion is the primary dissipating region for the heat spreader. The frame portion can thus be made of a less expensive material, a more easily fabricated material and/or a material with a lower thermal conductivity relative to the base portion. “Accordingly, the cost of materials for the two piece heat spreader in accordance with the invention can be significantly less than conventional single piece heat spreader configurations.” (Page 2, para. 29 of the published application).

The foregoing clearly demonstrates that the specification supports the criticality of the claimed heat spreader construction, and that a heat spreader and frame formed by two different materials is not disclosed, taught or suggested in McCormick et al. Therefore, the rejections of claims 1, 3, 15, 20 and 25 should be withdrawn and claims 1, 3, 15, 20 and 25 allowed. In that claims 1, 3, 15, 20 and 25 are in condition for allowance, the rejections of claims 6-14, 16-22, 24 and 27, which depend therefrom, should be withdrawn and claims 6-14, 16-22, 24 and 27 allowed.

Claims 4, 5, 23, 26 and 28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over McCormick et al. in view of Edwards et al. In that independent claims 1, 20 and 25 are in condition for allowance, the rejections of claims 4, 5, 23, 26 and 28, which depend therefrom, should be withdrawn and claims 4, 5, 23, 26 and 28 allowed.

Conclusion

In summary, pending claims 1 and 3-28 are believed to be patentable for at least the reasons described above. Reconsideration and notice to that effect are respectfully requested. If there are

any remaining questions, the Examiner is requested to contact the undersigned at the number listed below.

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